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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

APR 10 1990

MEMORANDUM

SUBJECT: Metribuzin Product Chemistry and Residue Chemistry
Registration Standard Updates.

FROM: Richard D. Schmitt, Ph.D., Chief
Dietary Exposure Branch (DEB)
Health Effects Division (H7509C)

Richard D. Schmitt

TO: Lois Rossi, Chief
Reregistration Branch
Special Review & Reregistration Division (H7508C)

and

Reto Engler, Ph.D., Chief
Science Analysis and Coordination Branch
Health Effects Division (H7509C)

Attached are updates to the Product and Residue Chemistry Chapters of the Metribuzin Registration Standard prepared by Dynamac Corporation under supervision of the Dietary Exposure Branch, HED. They have undergone secondary review in the Dietary Exposure Branch and have been revised to reflect Agency policies.

These documents provide an in-depth analysis of the status of the Metribuzin Product and Residue Chemistry data bases as of 01/16/90. Revised data requirement tables are included.

Please note that Confidential Business Information accompanies the Product Chemistry Update as Appendices A, B and C.

If you need additional input please advise.

Attachment 1: Metribuzin Product Chemistry Registration
Standard Update

Attachment 2: Confidential Appendices A, B and C.

Attachment 3: Metribuzin Residue Chemistry Registration
Standard Update

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cc (with attachments 1, 2 & 3): W. Smith, Metribuzin
Registration Standard file, Metribuzin Subject File, C. Furlow
(PIB/FOD), J. Burrell (FOD)

cc (without attachments): W. Boodee, RF, Circ.(8)

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DYNAMAC
CORPORATION

Final Report

METRIBUZIN
Task 4: Product Chemistry
Registration Standard Update

February 27, 1990

Contract No. 68-D8-0080

Submitted to:
Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
The Dynamac Building
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METRIBUZINREGISTRATION STANDARD UPDATEPRODUCT CHEMISTRYTASK 4INTRODUCTION

A search listing of the Agency Product Label File conducted on 2/2/90 identifies two manufacturing-use products of metribuzin: the 50% formulation intermediate (FI; EPA Reg. No. 3125-305) and the 90% technical (T; EPA Reg. No. 3125-270). Both products are registered to Mobay Corporation.

The Metribuzin Guidance Document dated June, 1985 identifies generic and product-specific data for a 90 % T (mistakenly listed as unregistered) and for the 50% FI (EPA Reg. No. 3125-305). In response to the Guidance Document, Mobay has submitted product chemistry data (1980, MRID 00156321; 1983, MRID 00161509; 1985, MRIDs 00147003, 00156322, 00156323, and 00156324; 1986, MRID 00165012) pertaining to both the 50% FI (EPA Reg. No. 3125-305) and the 90% T (EPA Reg. No. 3125-270). These data were reviewed by the Agency (G. Makhijani, DEB Nos. 803, 804, and 1082; dated 7/26/86) and additional product chemistry data requirements were specified. In response to the Agency's review, Mobay submitted additional data (1986, MRIDs 00161507; 1983, MRID 00161509; and 1989, MRID 41284401). These data are presented below along with our conclusions.

Corresponding to each of the Topical Discussions listed below are the Guideline Reference Numbers from "Pesticide Assessment Guidelines - Subdivision D - Product Chemistry", referred to in Title 40 of the Code of Federal Regulations (40 CFR), Part 158, "Data Requirements for Registration", Subpart C, "Product Chemistry Data Requirements". These regulations and guidelines explain the minimum data that the Agency needs to adequately assess the product chemistry of metribuzin.

Guidelines Reference No.
from 40 CFR §158.155-190

Product Composition and Manufacture	61-(1-3)
Analysis and Certification of Product Ingredients	62-(1-3)
Physical and Chemical Characteristics	63-(2-20)

SUMMARY

The following Product Chemistry data are required for the Mobay 90% T (EPA Reg. No. 3125-270):

- (i) a more detailed description of the manufacturing process; (ii) validation (recovery) data for enforcement analytical methods; and, (iii) a clarification of solubility data for the organic solvent dichloromethane and data pertaining to oxidizing or reducing action.

PRODUCT IDENTITY AND COMPOSITION

61-1. Product Identity and Disclosure of Ingredients

The Metribuzin Guidance Document dated June, 1985 requires additional generic and product-specific data concerning product composition. In response to the Guidance Document, Mobay submitted data for the 90% T (MRIDs 00147003 and 00161509) and for the 50% FI (MRIDs 00156321 and 00156322). These data were reviewed by G. Makhijani (DEB Nos. 803, 804, and 1082; dated 7/26/86). Data pertaining to the FI were deemed acceptable. Data pertaining to the technical product were found to be acceptable with the provision that they are resubmitted on EPA Form 8570-4 (Rev. 2-85). A Confidential Statement of Formula was subsequently submitted (1989; MRID 41284401); the disclosure of ingredients appear in Confidential Appendix A. These data satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product composition for Mobay 90% T (EPA Reg. No. 3125-270)

61-2. Description of Beginning Materials and Manufacturing Process

The Metribuzin Guidance Document dated June, 1985 specifies generic and product-specific data requirements for metribuzin regarding starting materials and manufacturing/formulation process. In response to the Guidance Document, Mobay (1985; MRID 00156321) submitted information on the 50% FI (EPA Reg. No. 3125-305) as well as information (1985; MRIDs 00147003 and 00156324) for the 90% T (EPA Reg. No. 3125-270). This information was reviewed by G. Makhijani (DEB Nos. 803, 804, and 1082; dated 7/26/86). The information submitted for the 50% FI was found to be acceptable. The information submitted for the 90% T was found inadequate to satisfy the requirements of 40 CFR §158.160 and §158.162 (Guideline Reference No. 61-2) regarding starting materials and the production process for the 90% T (EPA Reg. No. 3125-270) because a more detailed description of the manufacturing process (i.e. description of each step of the process, any pressure, temperature conditions required for maximum yield, and quality control measures) was required. The registrant has not responded to this requirement.

61-3. Discussion of Formation of Impurities

The Metribuzin Guidance Document dated June, 1985 specifies generic and product-specific data requirements regarding discussion of formation of impurities. In response to the Guidance Document, Mobay submitted a discussion of impurities in the 90% T (1985; MRID 00147003) and the 50% FI (1985; MRID 00156321). This information was reviewed by G. Makhijani (DEB Nos. 803, 804, and 1082; dated 7/26/86). These submissions partially satisfy the data requirements. Further discussions are required on (i) the possible degradation of ingredients in the product after production, (ii) post-production reactions between the ingredients in the product, (iii) possible contamination from packaging materials or production equipment, (iv) process control, (v) purification and (vi) quality control measures.

ANALYSIS AND CERTIFICATION OF PRODUCT INGREDIENTS62-1. Preliminary Analysis

The Metribuzin Guidance Document dated June, 1985 specifies generic and product-specific data requirements for metribuzin regarding preliminary analysis, including analysis of the technical product for nitrosamines. In response to the Guidance Document, Mobay Corp. (1985; MRID 00147003) submitted additional data pertaining to the preliminary analysis of five batches of the 90% T (EPA Reg. No. 3125-270) manufactured in 1978. These data were reviewed by G. Makhijani (DEB Nos. 803, 804, and 1082; dated 7/26/86) and additional analyses were required using more recently produced batches. Mobay responded with preliminary analysis data (1989; MRID 41284401) from five batches manufactured in 1986, as well as with analyses of 275 batches manufactured between January 17 and December 30, 1988. These data, presented in Confidential Appendix B, satisfy the requirements of 40 CFR §158.170 (Guideline Reference No. 62-1) regarding preliminary analysis for the Mobay 90% T (EPA Reg. No. 3125-270). No data were submitted by the registrant pertaining to the preliminary analysis of the Mobay 50% FI (EPA Reg. No. 3125-305); however, no data are required because this product is formulated from a registered technical product for which analytical data are available.

In response to the Metribuzin Guidance Document dated June, 1985, Mobay Corp. (1986; MRID 00161507) submitted data pertaining to N-nitrosamine analysis (volatile and non-volatile) of the 90% T and 50% FI (EPA Reg. Nos. 3125-270 and 3125-305, respectively). N-nitrosamines were nondetectable (detection limits 20-300 ppb) in all samples. No additional data are required.

62-2. Certification of Limits

In response to the Guidance Document, Mobay submitted certified limits for the 90% T (1985; MRIDs 00147003 and 00161509) and the 50% FI (1985; MRIDs 00156321 and 00156322). These data were reviewed by G. Makhijani (DEB Nos. 803, 804, and 1082; dated 7/26/86). Data pertaining to the FI (EPA Reg. No. 3125-305) were found to be acceptable. Data pertaining to the T were conditionally accepted provided that the registrant resubmits the data on EPA Form 8570-4 (Rev. 2-85). Certified limits for the 90% T (EPA Reg. No. 3125-270), shown in Confidential Appendix A, have been amended and submitted on the proper form (1989; MRID 41284401). These data satisfy requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) regarding certified limits for the Mobay 90% T (EPA Reg. No. 3125-270).

62-3. Enforcement Analytical Methods

The Metribuzin Guidance Document June, 1985 requires analytical methods to be submitted for analysis of the 50% FI (EPA Reg. No. 3125-305) for metribuzin and its impurities. In response to the Guidance Document, Mobay (1985; MRID 00147003) submitted Methods C-28.1, C-28.4, and C-28.19. These methods were reviewed by G. Makhijani (DEB Nos. 803, 804, and 1082; dated 7/26/86) who concluded that validation data were lacking for all methods. Mobay (1989; MRID 41284401) submitted additional methods designated C-28.35 and C-28.14 that were used to obtain more recent preliminary analysis data (see Confidential Appendix C). Further validation data concerning the accuracy (recovery) of Methods C-28.35, C-28.1 and C-28.14 are required.

PHYSICAL AND CHEMICAL CHARACTERISTICS

The Metribuzin Guidance Document June, 1985 specifies generic and product-specific data requirements for all physical and chemical characteristics pertaining to the 90% T and 50% FI (EPA Reg. Nos. 3125-270 and 3125-305, respectively). Data (1985-1986; MRIDs 00147003, 00156324 and 00165012) submitted for the 90% T (EPA Reg. No. 3125-270) were reviewed by G. Makhijani (DEB Nos. 803, 804, and 1082; dated 7/26/86) and were found adequate to satisfy the requirements for color, physical state, odor, melting point, density, vapor pressure, dissociation constant, octanol/water partition coefficient, pH, and stability. However, a clarification was required on solubility data since conflicting solubility data was noted on the solvent dichloromethane. Adequate data pertaining to explodability, storage stability, and corrosiveness were also included in MRIDs 00147003 and 00156324. No data have been submitted on oxidizing and reducing action.

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Data (1985; MRID 00156323) submitted for the 50% FI (EPA Reg. No. 3125-305) were reviewed by G. Makhijani (DEB Nos. 803, 804, and 1082; dated 7/26/86) and were found adequate to satisfy the requirements for color, physical state, odor, density, pH, oxidizing or reducing action, explodability, storage stability, and corrosion characteristics. No additional data are required for the 50% FI (EPA Reg. No. 3125-305) product.

Product Chemistry Citations (used):

00147003 Mobay Chemical Corp. (1985) Product Chemistry of Sencor Technical. Unpublished study. 104 p.

00156321 Talbott, T. (1980) The Composition of Sencor: Report No. 68761. Unpublished study prepared by Mobay Chemical Corp. 11 p.

00156322 Johnson, M. (1985) Maximum and Minimum Certified Limits for Sencor 50% Wettable Powder (Repacking): GLC Determination of Sencor and Bay 98719 (N-Methyl Isomer): Report No. 90369: C-28.1. Unpublished study. 13 p.

00156323 Mobay Chemical Corp. (1985) [Physical and Chemical Characteristics of Sencor 50% Wettable Powder]. Unpublished compilation. 22 p.

00156324 Mobay Chemical Corp. (1985) Product Chemistry of Sencor Technical: Brochure 1433: Supplement 1 [to Brochure 1388]. Unpublished compilation. 81 p.

00161507 Talbott, T.; Riegner, K. (1986) Volatile and Nonvolatile N-Nitrosamine Analyses in Sencor Technical and Sencor 50 Wettable Powder under Storage Conditions: Report No. 93062. Unpublished study prepared by Mobay Corporation. 70 p.

00161509 Talbott, T. (1983) Maximum and Minimum Certified Limits for Sencor: Report No. 86268. Unpublished study prepared by Mobay Corporation. 4 p.

00165012 Betker, W. (1986) The Solubility, Melting Point and Density of Technical Sencor: Report No. 90935. Unpublished study prepared by Mobay Corp. 5 p.

41284401 Talbott, T. (1989) Product Chemistry of Sencor^R Technical; prepared by Mobay Corp. 84 p.

Product Chemistry Citations (not used):

[The following references were not used because they contain information that is either duplicated in the above-cited documents or superceded by more recent data submissions.]

00161505 Mobay Corporation (1986) Validation of Technical Sencor Certified Limits Methodology: Report No. 91780. Unpublished compilation. 8 p.

00161506 Slahck, S. (1986) The Composition of Technical Sencor: Report No. 93048. Unpublished study prepared by Mobay Corporation. 17 p.

TABLE A. GENERIC DATA REQUIREMENTS FOR THE METRIBUZIN TECHNICAL GRADE OF THE ACTIV

Data Requirement	Test Substance ²	Does EPA have data to satisfy this requirement?	Bibliographic Citation	Must data unde 3(c)
<u>40 CFR §158.155-190 Product Chemistry</u>				
<u>Product Composition</u>				
61-2. Beginning Materials and Production Process	TGAI	Partially	00147003 00156324	
61-3. Formation of Impurities	TGAI	Partially	00147003	
<u>Analysis and Certification of Product Ingredients</u>				
62-1. Preliminary Analysis	TGAI	Yes	00147003 41284401	
<u>Physical and Chemical Characteristics⁵</u>				
63-2. Color	TGAI	Yes	00147003 00156324	
63-3. Physical State	TGAI	Yes	00147003 00156324	
63-4. Odor	TGAI	Yes	00147003 00156324	
63-5. Melting Point	TGAI	Yes	00147003 00156324	
63-6. Boiling Point	TGAI	No	N/A	
63-7. Density, Bulk Density, or Specific Gravity	TGAI	Yes	00156324	
63-8. Solubility	TGAI or PAI	Partially	00147003 00156324	
63-9. Vapor Pressure	TGAI or PAI	Yes	00147003	
63-10. Dissociation Constant	TGAI or PAI	Yes	00147003	
63-11. Octanol/Water Partitioning Coefficient	PAI	Yes	00147003	
63-12. pH	TGAI	Yes	00147003	
63-13. Stability	TGAI	Yes	00147003	
<u>Other Requirements:</u>				
64-1. Submittal of Samples	N/A	N/A	N/A	

1. Additional data requirements are listed in the following Table B, "Generic Data Requirements for Metribuzin Manufacturing-Use Products".

TABLE A. (Continued).

-
2. Test substance: PAI = purified active ingredient; TGA I = technical grade of the MP = manufacturing-use product.
3. A more detailed description of the manufacturing process (i.e. description of any pressure, temperature conditions required for maximum yield, and quality control for the 90% T (EPA Reg. No. 3125-270).
4. Information submitted in response to the Guidance Document partially fulfill the 90% T (EPA Reg. No. 3125-270). Further discussions are required on (i) the possible ingredients in the product after production, (ii) post-production reactions between product, (iii) possible contamination from packaging materials or production equipment control, (v) purification and (vi) quality control measures.
5. As required by 40 CFR §158.190 and more fully described in the Pesticide Assessment Subdivision D, Guidelines Reference Nos. 63-2 through 63-13, data must be submitted characteristics (color, physical state, odor, melting point, boiling point, specific vapor pressure, dissociation constant, octanol/water partition coefficient, pH, and additional data requirements listed in Table 8 pertaining to physicochemical characteristics of technical products which are also manufacturing use products.
6. Data on boiling point are not required since the technical product is a solid.
7. The registrant must clarify the conflicting data reported for the solubility of dichloromethane.

TABLE B. PRODUCT SPECIFIC DATA REQUIREMENTS FOR METRIBUZIN MANUFACTURING-USE PRODU

Data Requirement	Test Substance ²	Does EPA have data to satisfy this requirement?	Bibliographic Citation	Must data under 3(c)
<u>40 CFR §158.155-190 Product Chemistry</u>				
<u>Product Composition</u>				
61-1. Product Composition	MP	Yes	00147003 00156321 00156322 00161509 41284401	
61-2. Beginning Materials & Production/Formulation Process	MP	Partially	00147003 00156321 00156324	
61-3. Formation of Impurities	MP	Partially	00147003 00156321	
<u>Analysis and Certification of Product Ingredients</u>				
62-1. Preliminary Analysis	MP	Yes	00147003 41284401	
62-2. Certified Limits	MP	Yes	00147003 00156321 00156322 00161509	
62-3. Enforcement Analytical Methods	MP	Partially	00147003 41284401	
<u>Physical and Chemical Characteristics⁶</u>				
63-2. Color	MP	Yes	00147003 00156323 00156324	
63-3. Physical State	MP	Yes	00147003 00156323 00156324	
63-4. Odor	MP	Yes	00147003 00156323 00156324	
63-7. Density, Bulk Density, or Specific Gravity	MP	Yes	00156323 00156324	
63-12. pH	MP	Yes	00147003 00156323	
62-14. Oxidizing or Reducing Action	MP	No	N/A	
62-15. Flammability	MP	No	N/A	
63-16. Explodability	MP	Yes	00147003 00156323	
63-17. Storage Stability	MP	Yes	00156323 00156324	

(Continued, footnotes follow)

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TABLE B. (Continued).

Data Requirement	Test Substance	Does EPA have data to satisfy this requirement?	Bibliographic Citation	Must data under 3(c)
63-18. Viscosity	MP	No	N/A	
63-19. Miscibility	MP	No	N/A	
63-20. Corrosion Characteristics	MP	Yes	00147003 00156323	
<u>Other Requirements:</u>				
64-1. Submittal of Samples	N/A	N/A	N/A	

1. These requirements pertain to the Mobay Corporation 90% T and 50% FI (EPA Reg. 305, respectively). Additional data requirements are listed in the preceding Table Requirements for the Metribuzin Technical Grade of the Active Ingredient".

2. Test substance: PAI = purified active ingredient; TGA1 = technical grade of the MP = manufacturing-use product.

3. A more detailed description of the manufacturing process (i.e. description of any pressure, temperature conditions required for maximum yield, and quality control for the 90% T (EPA Reg. No. 3125-270).

4. Information submitted in response to the Guidance Document partially fulfill the 90% T (EPA Reg. No. 3125-270). Further discussions are required on (i) the possible ingredients in the product after production, (ii) post-production reactions between product, (iii) possible contamination from packaging materials or production equipment control, (v) purification and (vi) quality control measures.

5. Data are required concerning the accuracy (recovery) of HPLC and GLC methods used of the active ingredient and its structurally related impurities in the 90% T (EPA

6. As required in 40 CFR §158.190 and more fully described in the Pesticide Assessment Subdivision D, Guidelines Reference Nos. 63-2 through 63-20, data must be submitted

TABLE B. (Continued).

characteristics of each manufacturing-use product (color, physical state, odor, specific oxidizing or reducing action, flammability, explosability, storage stability, viscosity, corrosion characteristics). Additional data requirements regarding physicochemical manufacturing-use products which contain only the technical grade of the active ingredient are listed in Table A, "Generic Data Requirements for the Metribuzin Technical Grade of the Active Ingredient".

7. Data are required on oxidizing/reducing potential if product contains an oxidizing agent.
 8. Data are not required on flammability since the products are solids.
 9. Data on viscosity are not required since the products are solids.
 10. Data on miscibility are not required since the products are not emulsifiable in petroleum solvents.
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METRIBUZIN

PRODUCT CHEMISTRY

TASK 4

(Final Report)

CONFIDENTIAL APPENDICES

Appendix A: 1 Page
Appendix B: 2 Pages
Appendix C: 1 Page

Confidential Appendices to the Scientific Review of Registration
Standard Follow-up Report for the pesticide metribuzin by the
Dietary Exposure Branch [Confidential FIFRA Trade Secret/CBI].

Page ____ is not included in this copy.

Pages 16 through 19 are not included in this copy.

The material not included contains the following type of information:

- ☐ Identity of product inert ingredients.
- ☐ Identity of product impurities.
- ☒ Description of the product manufacturing process.
- ☒ Description of quality control procedures.
- ☐ Identity of the source of product ingredients.
- ☐ Sales or other commercial/financial information.
- ☐ A draft product label.
- ☐ The product confidential statement of formula.
- ☐ Information about a pending registration action.
- ☐ FIFRA registration data.
- ☐ The document is a duplicate of page(s) _____.
- ☐ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.



Final Report

METRIBUZIN
Task 4: Residue Chemistry
Registration Standard Update

February 27, 1990

Contract No. 68-D8-0080

Submitted to:
Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
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11140 Rockville Pike
Rockville, MD 20852

METRIBUZINREGISTRATION STANDARD UPDATERESIDUE CHEMISTRYTask - 4Table of Contents

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METRIBUZINREGISTRATION STANDARD UPDATERESIDUE CHEMISTRYTask - 4INTRODUCTION

The 5/2/89 Update of the Index of Pesticide Chemicals identifies registered food/feed uses for the herbicide Metribuzin. Metribuzin is registered for use on alfalfa, alfalfa mixed with grasses, asparagus, barley, corn (field), lentils, peas (including dry and field), potatoes, sainfoin (including mixed stands of grasses), soybeans, sugarcane, tomatoes, and wheat. Metribuzin formulations registered for food/feed uses are the 50-75% wettable powder (WP), 64.3-75% dry flowable (DF), 1.45-4 lb/gal emulsifiable concentrate (EC), and 4 lb/gal flowable concentrate (FLC). Metribuzin formulations may be applied to the soil preplant, at plant, postplant, preemergence, or postemergence. Dormant applications are used for alfalfa, alfalfa mixed with grasses, and sainfoin; postharvest applications are used for asparagus, barley, sugarcane, and wheat. Irrigation applications (including sprinkler and center pivot) are permitted on potatoes and soybeans. Preplant and postplant applications may be soil incorporated. In addition, metribuzin may be applied to noncrop areas (except rights of way) and fallow land.

The Metribuzin Guidance Document dated 6/85 identifies outstanding data gaps for plant metabolism, animal metabolism, and the magnitude of the residue in dried peas, soybeans, soybean forage, soybean hay, field corn grain, corn fodder, corn silage, wheat hay, alfalfa seed, sugarcane forage, and in the processed commodities of corn, wheat, and sugarcane. In response to these requirements, Mobay Chemical Corp. has submitted data pertaining to plant metabolism (1977-1987; MRIDs 00159415, 00159416, 00159417, 40255501, and 40255502), animal metabolism (1986-88; MRIDs 40042501, 40042502, and 41020601), residue analytical methods (1988; MRID 41021001), storage stability (1988; MRID 41020601), and the magnitude of the residue in plants and animals (MRIDs 40277901, 40277902, 40277903, 40277904, 40277905, 40367601, 40367604, 40367605, 40371701, and 40802701). These data up to January 16, 1990 have been reviewed by the Agency for their adequacy in fulfilling the outstanding data requirements.

Tolerances for residues of metribuzin in or on food/feed items and in processed commodities are currently expressed in terms of the combined residues of metribuzin and its triazinone metabolites [40 CFR §180.332, 185.250, 186.250].

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SUMMARY

The following additional Metribuzin Residue Chemistry data are required:

- Additional data pertaining to the qualitative nature of the residue in plants.
- Additional data pertaining to the qualitative nature of the residue in ruminants and poultry.
- Sample storage intervals and conditions must be supplied for all residue data submitted in support of tolerances, whether previously submitted or required in this update.
- Additional field trial data depicting metribuzin residues of concern in or on soybean forage and hay.
- Data depicting the potential for concentration of metribuzin residues of concern in the processed products of soybeans, field corn grain, and wheat grain.

QUALITATIVE NATURE OF THE RESIDUE IN PLANTS

Conclusions:

The Metribuzin Guidance Document dated 6/85 requires additional data reflecting the distribution and metabolism of ring-labeled [¹⁴C]metribuzin in mature soybeans (foliage and beans) following preemergent soil application at 0.5 lb ai/A and in mature wheat (foliage and grain) following postemergence broadcast application at 0.75 lb ai/A. Determination of conjugated ¹⁴C-residues of metribuzin by hydrolysis, and reextraction of plant residues and aqueous fractions is also required.

In response to these requirements, Mobay Chemical Corp. (19??-87; MRIDs 00159415, 00159416, 00159417, 40255501, and 40255502) has submitted data on the metabolism of [¹⁴C]metribuzin in wheat and soybeans. These data were reviewed in an EPA memorandum by M.T. Flood dated 10/27/89 (DEB Nos. 4584 and 4585), who concludes that the metabolism of metribuzin in plants is not adequately understood.

The available soybean data (MRID 40255502) indicate that the major metabolite in soybean plant tissue is DADK (19.2% of the TRR). Minor metabolites are metribuzin, DK, hydroxy-*t*-butyl-DADK, hydroxy-*t*-butyl-metribuzin, and 3-amino-DA; together accounting for ca. 3.6% of the TRR. The major metabolite found in soybean seeds is DADK, free or conjugated, accounting for 44.5% of the TRR; hydroxy-*t*-butyl-DADK accounts for 0.7% of the TRR. These data were determined not to satisfy plant metabolism

data requirements because unknown metabolites (Metabolites 15 and 11) found in the aqueous fractions of soybean plants and seeds were not adequately characterized.

The available wheat metabolism data (MRID 40255501) indicate that the major metabolite in wheat forage is unchanged metribuzin (42.8% TRR) with DADK (6.8%) and DK (7.5%) appearing as minor metabolites. The following metabolites accounting for a total of 24.2% of the TRR were identified in wheat straw: metribuzin (3.9%), DADK (11.2%), DK (3.5%), DA (0.7%), 3-amino DA (4.3%), and hydroxy-*t*-butyl-DADK (0.6%). Large portions of the bound residues in wheat straw were shown to be associated with lignin (ca. 25% of the TRR) and other biopolymers (10-15% of the TRR), such as starch or protein. In grain only 9.3% of the TRR was identified consisting of metribuzin, DADK, DK, DA, hydroxy-*t*-butyl-DADK, and hydroxy-*t*-butyl-DA; over 50% of the TRR in grain consists of unidentified water-soluble residues. These data were determined not to satisfy plant metabolism data requirements because unidentified water-soluble metabolites in wheat grain were not adequately characterized. Additional soybean (MRIDs 00159415 and 00159416) and wheat metabolism data (MRID 00159417) were determined not to contain useful information.

The metabolism of metribuzin in plants remains inadequately described because unidentified residues in the aqueous fraction of soybean plants and seed and unidentified water soluble ¹⁴C-residues present in wheat grain have not been adequately characterized. The following additional data are required:

- The identities of the unknown metabolites designated "Metabolite 15" in soybean plant tissue and "Metabolite 11" in soybean seeds must be adequately characterized. These metabolites must be confirmed using suitable methods such as mass spectroscopy (MS) or nuclear magnetic resonance (NMR).
- The registrant must characterize the radioactive residues in the aqueous fraction of wheat grain using TLC or HPLC. Any individual metabolite present at over 10% of the total radioactive residue must be confirmed using suitable methods such as mass spectroscopy (MS) or nuclear magnetic resonance (NMR).
- Representative samples of wheat straw and soybean tissue from the plant metabolism studies must be analyzed using a currently accepted or proposed enforcement analytical method in order to ascertain that this method will determine all possible metabolites of concern.

References (used):

MRID(s): 40255501. 40255502.

References (not used):

[The following reference(s) were determined by DEB not to contain useful information.]

MRID(s): 00159415. 00159416. 00159417.

Discussion of the data:

N/A.

QUALITATIVE NATURE OF THE RESIDUE IN ANIMALS

Conclusions:

The Metribuzin Guidance Document dated 6/85 concludes that the qualitative nature of the residue in animals is not adequately understood and requires additional data on the metabolism of [¹⁴C]metribuzin in ruminants and poultry.

Mobay Chemical Corp. submitted a goat metabolism study (1986; MRID 40042501), which is the subject of an Agency review (M. T. Flood, EPA Memorandum dated 10/27/89; DEB Nos. 4584 and 4585). These data indicate that the radioactive residues in muscle, fat, kidney, and liver tissue of goats consist of unchanged metribuzin, butylthion, 2-methyl-DADK, DA, DADK (free and conjugated), and DK (free and conjugated). The portion of the total radioactive residue (TRR) characterized was 81.1% in fat, 78.1% in muscle, 58.7% in kidney, and 42.8% in liver. A total of 4.3% of the TRR in milk was characterized, consisting of metribuzin (2.3%), DA (0.6%), DADK (1.1%), and DK (0.3%). However, certain unidentified ¹⁴C-residues accounted for a high percentage of the TRR in goat liver ("Unknown 9"; 17.6%), kidney ("Unknowns 8a and 8b", 19.7% and 18.1%, respectively), and milk ("Unknowns 8a and 8b", 43% and 40.9%, respectively). Additionally, the registrant did not report the percentage of total radioactivity recovered for all animal tissues based on combustion analysis. For these reasons, it is concluded that these data do not satisfy the ruminant metabolism data requirements. DEB defers to the toxicology Branch as to the toxicological significance of butylthion.

Mobay Chemical Corp. submitted a poultry metabolism study (1986; MRID 40042501) which is the subject of an Agency memorandum (M. T. Flood, EPA Memorandum dated 10/27/89 ;DEB Nos. 4584 and 4585). These data indicate that the total terminal residue in poultry liver, muscle, and fat tissue and in eggs consists of unchanged

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metribuzin, DA, DADK, DK, and their conjugates. A total of 64.4% of the TRR in liver, 55.9% in kidney, 84.2% in muscle, 92.8% in fat, 75.9% in skin, and 63.2% in eggs was identified. However, representative thin-layer chromatograms (TLC's) and the percent recoveries of ¹⁴C-activity based on the initial tissue radioactive residue as determined by liquid scintillation counting (LSC) were not submitted. For these reasons it is concluded that these data do not satisfy the poultry metabolism data requirements.

The qualitative nature of the residue in ruminants and poultry tissue is not adequately understood. The following additional data are required:

- The percent recoveries of radioactivity (the total recovered by the various extraction procedures divided by the radioactivity determined by combustion and liquid scintillation counting x 100) must be reported for both the ruminant and poultry metabolism studies.
- The registrant must attempt to characterize the unidentified metabolites designated "Unknown 9" in goat liver and "Unknowns 8a and 8b" in goat kidney and milk. Data showing the identity of 2 N HCl hydrolysis products from "Unknown 9" in goat liver may be acceptable. In goat kidney the conditions of hydrolysis applied to unknowns 8a and 8b (including temperature and time) must also be submitted. Attempts should be made to identify the unknowns by suitable confirmatory methods such as NMR or MS.
- Representative chromatograms (TLC) from the ruminant and poultry metabolism studies must be submitted.
- Representative samples from the poultry and ruminant metabolism studies must be analyzed using a currently accepted or proposed enforcement analytical method in order to ascertain that this method will determine all possible metabolites of concern.

References (used):

MRID(s): 40042501. 40042502.

Discussion of the data:

N/A.

RESIDUE ANALYTICAL METHODS

The Metribuzin Guidance Document dated 6/85 reserves the requirement for additional analytical methods for data collection and enforcement pending submission and evaluation of the requested data regarding the nature of the residue in plants and animals. The qualitative nature of the residue in plants and animals has not been adequately described. Therefore, the adequacy of the available methods cannot be ascertained.

The FDA Pesttrak database (PAM Vol. I Appendix, dated 10/25/89) contains data concerning the applicability of multiresidue Protocol D and Protocol E (nonfatty foods) to metribuzin per se. Mobay Chemical Corp. has submitted data (1988; MRID 41021001) depicting the recovery of metribuzin and its triazinone metabolites using FDA Multiresidue Protocols I-IV published in Pesticide Analytical Manual (PAM), Vol. I. The submitted multiresidue test data were forwarded by DEB (M.T. Flood, EPA Memorandum DEB Nos. 5867 and 5868, dated 11/17/89) to the FDA for updating of PAM I.

The following additional data are required:

- If radiolabeled validation of existing analytical methodology for plants and animals (refer to "Qualitative Nature of the Residue in Plants" and Qualitative Nature of the Residue in Animals" for additional details) indicates that a major portion of the total radioactive residue is not recovered and identified by the available methods, radiolabeled validation of new proposed methodology will be required.

The currently preferred enforcement method, published in PAM Vol. II as Method II, is a GLC method using electron capture detection for determination of residues of metribuzin, DA, DADK, and DK in or on potatoes .

References (used):

MRID(s): 41021001.

Discussion of the data:

N/A.

STORAGE STABILITY DATAConclusions:

The Metribuzin Guidance Document dated 6/85 did not specify data requirements for storage stability. The Agency now requires that storage intervals and sample storage conditions be reported for all residue data submitted in support of established tolerances or otherwise required by the Agency, and that the residue data be accompanied by data depicting the stability of all residues of concern in storage (Pesticide Assessment Guidelines, Subdivision O). The Metribuzin Residue Chemistry Chapter (dated 12/84) notes that in carrots stored at intervals of ca. 4 months, a significant decline in the initial levels of metribuzin and DADK occur. Therefore, it was recommended that any additional data requested in the Metribuzin Registration Standard be generated from samples stored (frozen) for no longer than 2 weeks prior to analysis.

Mobay Chemical Corporation (1988; MRID 41020601, Report No. 98504) submitted additional data regarding storage stability in various biological matrices in conjunction with PP#8F3683/FAP#8H5563 for proposed tolerances for the combined residues of metribuzin in or on various agricultural commodities and processed products. These data have undergone Agency review (M.T. Flood, dated 11/22/89; no DEB No. assigned). The data indicate that the stability of metribuzin and its triazinone metabolites DA and DK in frozen matrices varies widely depending on the particular matrix. DADK is stable under frozen storage. It is concluded, that any additional residue data submitted must either be generated from samples stored frozen no longer than 2 weeks or be accompanied by storage stability data for metribuzin, DA, and DK.

The following additional data are required:

- The sample storage intervals and conditions must be supplied for all residue data submitted in support of tolerances, whether previously submitted or required in this update. Storage stability data in support of previously submitted residue data are required for only those samples deemed to be useful for tolerance assessment. Data are also required which depict the decline in the levels of metribuzin residues of concern in commodities stored under the range of conditions and for the range of intervals specified. Crop samples bearing measurable weathered residues or fortified with metribuzin residues of concern and fortified meat, milk, and egg samples must be analyzed immediately after harvest or fortification and again after storage intervals that allow for reasonable unforeseen delays in sample analysis. In laboratory tests using fortified

samples the pure active ingredient and pure metabolites must be used. However, if field-weathered residues are used, the test substance must be a typical end use product. For additional guidance on conducting storage stability studies, the registrant is referred to an August, 1987 Position Document on the Effects of Storage Validity of Pesticide Residue Data available from NTIS under order no. PB 88112362/AS.

- The qualitative nature of the residue in plants and animals is not adequately understood. If the requested data on plant and animal metabolism indicate the presence of additional metabolites of toxicological concern, data depicting the stability of these residues during storage will be required.

References (used):

MRID(s): 41020601.

Discussion of the data:

N/A.

MAGNITUDE OF THE RESIDUE IN PLANTS

The Metribuzin Guidance Document dated 6/85 identifies field residue data requirements for peas (dry), soybeans, soybean forage, soybean hay, field corn grain, corn fodder, corn silage, wheat hay, alfalfa seed, and sugarcane forage. Also, processing data are required for corn, wheat, and sugarcane.

The conclusions stated below regarding the adequacy of the established tolerances may change on receipt of the required plant metabolism and storage stability data. The registrant should be urged to complete and submit all required plant metabolism studies prior to initiation of required field trials and processing studies.

Root and Tuber Vegetables Group

Carrots

Tolerance(s):

A tolerance of 0.3 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in or on carrots [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 did not include evaluation of data pertaining to the combined residues of metribuzin and its triazinone metabolites in or on carrots because the data were under review. Tolerances for the combined residues of metribuzin and its triazinone metabolites in or on carrots were established after issuance of the 1985 Guidance Document. Presently, there are no registered uses for metribuzin on carrots. Unless, an interested party declares intent to include this use site on a product label and to submit appropriate supporting residue data, we recommend that the existing tolerance for the combined residues of metribuzin and its triazinone metabolites in or on carrots be revoked.

References (used):

N/A.

Discussion of the data:

N/A.

Legume Vegetables Group

Peas (succulent and dry)

Tolerances(s):

Tolerances of 0.1 and 0.05 ppm have been established for the combined residues of metribuzin and its triazinone metabolites in or on peas (succulent) and peas (dry), respectively [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 requires additional residue data depicting the combined residues of metribuzin, DADK, DA, and DK, in or on dried pea seed harvested 50 days following postemergence application of the 50% WP formulation at 0.38 lb ai/A from tests conducted in the Northwest region of the U.S.

Data submitted by Mobay Chemical Corp. (1987; MRID 40277903, Report No. 94735) in response to this requirement were the subject of an Agency review by M.T. Flood (EPA Memorandum dated 10/27/89; DEB Nos. 4584 and 4585), who concludes that the available residue data support the currently established tolerance of 0.05 ppm for combined residues of metribuzin and its triazinone metabolites in or on dry peas. Residue levels in or on dry peas were <0.01 ppm. No additional data are required for this topic.

References (used):

MRID(s): 40277903.

Discussion of the data:

N/A.

Soybeans

Tolerance(s):

A tolerance of 0.1 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in or on soybeans [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 requires additional residue data on soybeans from tests conducted in the MS delta reflecting two postemergence applications made at 7-day intervals of the 75% WP or 4 lb/gal FLC formulation at 0.5 lb ai/A/application preceded by a preemergence application at 1 lb ai/A and a preplant application at 0.75 lb ai/A. No processing data were required by the Guidance Document. However, current Agency policy requires processing studies whenever there is a possibility of residue levels in processed foods or feed exceeding the levels in the raw agricultural commodity (RAC).

Data on soybeans (1987; MRID 40277904) and a proposed increase in the tolerance for soybeans from 0.1 to 0.25 ppm were submitted in response to the Guidance Document, and were the subject of an Agency review (M.F. Kovacs, EPA Memorandum DEB No. 4579, dated 2/8/89). The submitted residue data reflect a maximum residue of 0.14 ppm in or on soybeans following three applications at a total seasonal use rate of 2.125 lb ai/A/season (0.77x the maximum seasonal use rate recommended on the current label). Although, the tests were not conducted as outlined in the Guidance Document, DEB calculates that if a full treatment schedule were followed in the submitted field trials (2.750 vs. 2.125 lb ai/season), maximum residues in or on soybeans should not exceed 0.3 ppm. Therefore, it is recommended that the petitioner submit a revised Section F proposing a tolerance for the combined residues of metribuzin and its triazinone metabolites in or on soybeans at 0.3 ppm.

The following additional data are required:

- A processing study depicting metribuzin residues of concern in products (meal, hulls, soapstock, crude oil,

refined oil) processed from soybeans bearing measurable, weathered residues. It is recommended that an exaggerated rate greater than the theoretical concentration factor be used. If the data indicate a potential for concentration in any processed product, an appropriate food/feed additive tolerance must be proposed.

- The registrant must propose an appropriate tolerance for the combined residues of metribuzin and its triazinone metabolites in or on soybeans. The available data indicate that a tolerance of 0.3 ppm would be appropriate, toxicological considerations permitting.

References (used):

MRID(s): 40277904.

Discussion of the data:

N/A.

Foliage of the Legumes Vegetables Group

Pea vines and hay

Tolerances(s):

Tolerances of 0.5 and 0.05 ppm have been established for the combined residues of metribuzin and its triazinone metabolites in or on pea forage and pea vine hay, respectively [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 did not specifically require data on pea vines and pea hay because the data for lentil hay and forage would translate to pea vines and pea straw. The Metribuzin Residue Chemistry Chapter (dated 12/84) notes that the available data for residues in or on dry pea vines are insufficient to assess the adequacy of the established tolerance. Revised commodity definitions were recommended for "pea forage" and "pea hay".

In response, Mobay Chemical Corp. submitted data (1987; MRID 40277903; Report No. 94735) and a revised commodity definition from "pea vine hay" to "pea straw" which are the subject of an Agency review (M.T. Flood, EPA Memorandum DEB Nos. 4584 and 4585, 10/27/89). Residue levels in dry hay (straw) were 0.13 and 0.41 ppm; these levels were above the currently established tolerance for residues in or on pea hay. Mobay has requested that the

tolerance for hay be increased from 0.05 to 4 ppm (PP#8F3683/FAP8H5563). DEB considers the proposed tolerance of 4 ppm for pea straw to be appropriate. No additional data are required.

References (used):

MRID(s): 40277903.

Discussion of the data:

N/A.

Soybean forage and hay

Tolerances(s):

A tolerance of 4 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in or on soybean forage and hay [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 requires additional data depicting the combined residues of metribuzin, DADK, DA, and DK in or on soybean forage and hay harvested 40 days following the last of two postemergence applications of a representative WP or 4 lb/gal FLC formulation at 0.5 lb ai/A preceded by a preemergence application at 1 lb ai/A and a preplant application at 0.75 lb ai/A from tests conducted in the MS delta region.

In response to this requirement, Mobay Chemical Corp. has submitted data (1987; MRID 40277904) which are the subject of an EPA memorandum by M.F. Kovacs dated 2/8/89 (DEB No. 4579). Combined residues of metribuzin, DA, DK, and DADK were <0.01-0.12 ppm in or on soybean forage harvested ca. 40 days following three or four applications. Combined residues in or on soybean hay were 0.1-0.21 ppm when harvested ca. 79-89 days following these same treatments. The submitted data reflect less than a complete treatment schedule and/or maximum recommended application rate and are not supported by adequate storage stability data. Therefore, the following data are required:

- Data depicting metribuzin residues of concern in or on soybean forage and hay harvested 40 days following the last of two postemergence applications of a representative WP or the 4 lb/gal FLC formulation at 0.5 lb ai/A preceded by a preemergence application at 1 lb ai/A and a preplant application at 0.75 lb ai/A. Tests must be conducted in the MS delta region where this use is permitted.

References (used):

MRID(s): 40277904.

Discussion of the data:

N/A.

Fruiting Vegetables Group

Tomatoes

Tolerances(s):

A tolerances of 0.1 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in or on tomatoes [40 CFR §180.332].

A feed additive tolerance of 2 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in dried tomato pomace [40 CFR §186.250].

Conclusions:

The Metribuzin Guidance Document dated 6/85 recommends that a food additive tolerance of 0.2 ppm be proposed for the combined residues of metribuzin and its triazinone metabolites in tomato catsup and tomato puree. In response to this recommendation, Mobay Chemical Corp. has proposed a food additive tolerance of 0.2 ppm (PP#8F3683/FAP8H5563) for "tomatoes, processed products" (M.T. Flood, EPA Memorandum dated 10/27/89; DEB Nos. 4584 and 4585).

Reference(s) (used):

N/A.

Discussion of the data:

N/A.

Cereal Grains Group

Corn grain (field and sweet)

Tolerances(s):

Tolerances of 0.05 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in or on

fresh corn (inc. sweet k+CWHR) and corn grain (inc. popcorn) [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 requires additional data depicting residues in or on field corn grain harvested at normal maturity (ca. 70-89% dry matter) following a single preemergence application of the 50% WP or the 4 lb/gal FLC formulation at 0.5 lb ai/A from tests conducted in IA, MN, and NE. A processing study was also required depicting the potential for concentration of residues of metribuzin per se, DA, DK, and DADK in the processed products of field corn grain. In addition, a proposal for a feed additive tolerance for residues in fresh corn cannery waste was also required.

In response to these requirements, Mobay Chemical Corp. submitted data (1987; MRIDs 40277901, 40367605, and 40371701; Report Nos. 94739, 94740, and 94741, respectively) and proposed a tolerance of 0.1 ppm for residues in fresh cannery waste. These data are the subject of an Agency memorandum by M.T. Flood (DEB Nos. 4584 and 4585, dated 10/27/89), who concludes that the data support the tolerance for residues in or on corn grain. Residues were <0.01 ppm in or on all samples analyzed. However, storage stability data were required to validate these data along with a clarification of the use directions for corn. Mobay responded by pointing out the availability of storage stability data for metribuzin in PP#8F3656 (Ethiozin Herbicide). The storage stability data were accepted by M.T. Flood in a memo dated 11/22/89 (no DEB No. assigned). No processing study was conducted because residue levels in the dry corn kernels were at the limit of determination for all components except DADK which contained a residue of 0.03 ppm. DEB recommends that the processing study be completed since detectable residues were obtained for DADK. The registrant must submit a revised Section B proposing a maximum seasonal use rate on corn.

Although, Metribuzin is not currently registered for use on sweet corn, Mobay has complied with the recommendation of the Guidance Document and has proposed a tolerance of 0.1 ppm for residues in fresh cannery waste. DEB recommends in favor of establishing this tolerance (M.T. Flood, DEB Nos. 4584 and 4585, dated 10/27/89).

Presently, there are no registered uses for metribuzin on sweet corn and popcorn. Unless an interested party declares intent to include this use site on a product label and to submit appropriate supporting residue data, we recommend that the existing tolerance for the combined residues of metribuzin and its triazinone metabolites in or on corn, fresh (including sweet kernels + cob with husks removed) be revoked. Concomitant with the establishment of an individual tolerance for residues in or

on field corn grain we recommend that the tolerance for residues in or on corn grain (including popcorn) be revoked.

The following additional data are required:

- A processing study depicting metribuzin residues of concern in wet millings (starch, crude oil, and refined oil) and dry millings (grits, meal, flour, crude oil, and refined oil) processed from field corn grain bearing measurable, weathered residues. It is recommended that an exaggerated rate greater than the theoretical concentration factor be used. If the data indicate a potential for concentration in any processed product, an appropriate food/feed additive tolerance must be proposed.
- The registrant must amend all pertinent product labels to specify a maximum seasonal application rate, which must be consistent with that reflected in the residue data used to support the tolerance.

References (used):

MRID(s): 40277901. 40367605. 40371701.

Discussion of the data:

N/A.

Wheat

Tolerances(s):

A tolerance of 0.75 ppm have been established for the combined residues of metribuzin and its triazinone metabolites in or on wheat grain [40 CFR §180.332].

A food additive tolerance of 3 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in wheat milled fractions (except flour) [40 CFR §185.250.

A feed additive tolerance of 3 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in wheat milled fractions (except flour) [40 CFR §186.250.

Conclusions:

The Metribuzin Guidance Document dated 6/85 requires a processing study depicting the potential for concentration of residues in the processed fractions from wheat grain bearing measurable, weathered residues.

In response to this requirement, Mobay Chemical Corp. submitted data (1987; MRIDs 40277905, 40367601, and 40367604; Report Nos. 94742, 94743, and 94744, respectively) which are the subject of an Agency review (M.T. Flood, EPA Memorandum DEB Nos. 4584 and 4585, dated 10/27/89). Mature grain collected for processing contained metribuzin residues below the limit of detection of the method (0.05 ppm). Mobay has informed DEB of its intent to complete a new processing study at a later date. The registrant must submit a revised Section B specifying an appropriate PHI for winter wheat. The requirement for a wheat processing study is still outstanding. The following data are required:

- A processing study depicting metribuzin residues of concern in products (bran, flour, middlings, and shorts) and in grain dust processed from wheat grain bearing measurable, weathered residues. It is recommended that an exaggerated rate greater than the theoretical concentration factor be used. If the data indicate a potential for concentration in any processed product, an appropriate food/feed additive tolerance must be proposed.
- The registrant must amend all pertinent labels specifying an appropriate PHI for winter wheat consistent with that reflected in the residue data used to support the tolerance.

References (used):

MRID(s): 40277905. 40367601. 40367604.

Discussion of the data:

N/A.

Forage, Fodder, Hay, and Straw of Cereal Grains Group

Barley forage, hay, and straw

Tolerance(s):

A tolerance of 1 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in or on barley straw [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 concludes that the available data support the established tolerance for combined residues in or on barley straw and requires that the registrant

propose tolerances of 2 ppm for residues in or on barley forage and straw. A tolerance for residues in or on barley hay is also recommended.

In response to the Guidance Document, Mobay Chemical Corp. has proposed tolerances of 2 and 7 ppm for residues of metribuzin in or on barley forage and hay, respectively. With regard to the proposed tolerances for residues on barley forage and hay (PP#8F3683/FAP#8H5563), DEB (M.T. Flood, dated 11/22/89, no DEB No. assigned) concludes that the proposed tolerances are appropriate. The memorandum also points out that the Guidance Document requirement for the establishment of a tolerance of 2 ppm for residues in or on barley straw is in error and concludes that the existing tolerance of 1 ppm is appropriate. No additional data are required.

References (used):

N/A.

Discussion of the data:

N/A.

Corn forage and fodder

Tolerances(s):

Tolerances of 0.1 ppm have been established for the combined residues of metribuzin and its triazinone metabolites in or on corn forage and fodder [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 requires additional data depicting residues in or on corn fodder harvested at normal maturity following a single preemergence broadcast application with either the 50% WP or 4 lb/gal FLC formulation at 0.25 lb ai/A. Residue data on corn silage harvested from fields treated with a single preemergence broadcast application with the 50% WP or 4 lb/gal FLC at 0.25 lb ai/A is also required. A tolerance for residues in or on a silage is also recommended.

In response, Mobay Chemical Corp. submitted data (1987; MRIDs 40277901, 40367605, and 40371701; Report Nos. 94739, 94740, and 94741, respectively) along with a tolerance proposal for corn silage. These data are the subject of an Agency review by M.T. Flood (EPA memorandum DEB Nos. 4584 and 4585, dated 10/27/89), who concludes that the data support the tolerance for residues in or on corn fodder. Residues of DA, DK, and DADK were <0.01 ppm in or on dry corn fodder. Residues of metribuzin were <0.01 ppm

except in two samples which bore residues of 0.016 ppm and 0.01 ppm. However, storage stability data were required to validate these data. Mobay responded by pointing out the availability of storage stability data for metribuzin in PP#8F3656 (Ethiozin Herbicide). These data were accepted by M.T. Flood in a memo dated 11/22/89 (no DEB No. assigned).

No data were submitted for corn silage; however, no data are necessary because the tolerance for residues in or on forage covers residues in or on silage. No additional data are required.

References (used):

MRID(s): 40277901. 40371701. 4036705.

Discussion of the data:

N/A.

Wheat forage, hay, and straw

Tolerances(s):

Tolerances of 2 and 1 ppm have been established for the combined residues of metribuzin and its triazinone metabolites in or on wheat forage and straw, respectively [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 requires that a tolerance be established for combined residues in or on wheat hay based on data reflecting postemergence broadcast application (after wheat has fully tillered) of the 50% or 75% WP or 4 lb/gal FLC formulation at 0.5 or 0.75 lb ai/A.

In response to this requirement, Mobay Chemical Corp. submitted data (1987; MRIDs 40277905, 40367601, and 40367604, Report Nos. 94742, 94743, and 94744, respectively) along with a tolerance proposal for wheat hay which are the subject of an Agency review (M.T. Flood, EPA memorandum DEB Nos. 4584 and 4585, dated 10/27/89). These data indicate that combined residues of metribuzin and its triazinone metabolites were 0.64-1.55 ppm in or on samples of wheat forage harvest 14 days following postemergence application of metribuzin at 0.5 or 0.75 lb ai/A. Combined residues were 0.56-1.72 ppm in or on samples of hay harvested 14 days following these same treatments. DEB concludes that the data support the currently established tolerance of 2 ppm for combined residues in or on wheat forage. The data for wheat hay would support a tolerance of 7 ppm. No additional data are required for this topic.

References (used):

MRID(s): 40277905. 40367601. 40367604.

Discussion of the data:

N/A.

Non-grass Animal Feeds Group

Alfalfa forage, hay, and seed

Tolerances(s):

Tolerances of 2 and 7 ppm have been established for the combined residues of metribuzin and its triazinone metabolites in or on green alfalfa and alfalfa hay, respectively [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 requires that a tolerance for residues in or on alfalfa seed be established based on data depicting residues in or on mature alfalfa seed harvested 28 days following the last of two applications of a WP or 4 lb/gal FLC formulation at 1 lb ai/A from tests conducted in CA, SD, WI, and PA.

In response, Mobay Chemical Corp. submitted data (MRID 40277902, Report 94745) along with a tolerance proposal for residues in or on alfalfa seed, which are the subject of an Agency review (M.T. Flood, EPA Memorandum, DEB Nos. 4584 and 4585, dated 10/27/89). Residues of metribuzin and its metabolites were <0.01 ppm in or on the seed. DEB concurs with Mobay's proposed tolerance of 0.1 ppm for alfalfa seed with a PHI of 180 days. The available residue data are supported by storage stability data. In alfalfa chaff, metribuzin levels were <0.01-0.11 ppm. Mobay has proposed a tolerance of 1 ppm for residues in alfalfa chaff; however, a tolerance for alfalfa chaff is not necessary. The registrant must submit a revised Section B proposing a maximum seasonal use rate for alfalfa. In addition, the proposed use for seed alfalfa with a PHI of 180 days should be included on the label. The following additional data are required:

- The registrant must amend all pertinent labels to specify a maximum seasonal application rate for alfalfa, which must be consistent with that reflected in the residue data used to support the tolerance. In addition, the use site seed alfalfa must be added to all pertinent labels with a 180 day PHI.

References (used):

MRID(s): 40277902.

Discussion of the data:

N/A.

Miscellaneous Commodities

Asparagus

Tolerance(s):

A tolerance of 0.05 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in or on asparagus [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 recommends that the registrant propose a tolerance increase from 0.05 to 0.1 ppm for the combined residues of metribuzin and its triazinone metabolites in or on asparagus.

Data were submitted (1988; MRID 40802701, Report No. 95685) along with a proposed tolerance increase from 0.05 ppm to 0.1 ppm in response to this requirement, and were the subject of an Agency review (M.T. Flood, EPA memorandum DEB Nos. 4584 and 4585, dated 10/27/89. These data indicate that the combined residues of metribuzin and its triazinone metabolites were <0.05-<0.06 ppm in or on asparagus harvested 7 days following a single broadcast application of the 4 lb/gal FLC or 75% DF formulation at the maximum allowable rate. These data support a 0.1 ppm tolerance. However, it should be noted that storage stability data are required for the data used in support of this tolerance.

References (used):

MRID(s): 40802701.

Discussion of the data:

N/A.

Sugarcane

Tolerance(s):

A tolerance of 0.1 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in or on sugarcane [40 CFR §180.332].

A food additive tolerance of 0.3 ppm has been established for the combined residues of metribuzin and its triazinone metabolites in sugarcane molasses [40 CFR §185.250].

Feed additive tolerances of 2 ppm and 0.5 ppm have been established for the combined residues of metribuzin and its triazinone metabolites in sugarcane molasses and bagasse, respectively [40 CFR §186.250] (Note: the listing in 40 CFR §186.250 of 0.3 ppm for molasses is in error).

Conclusions:

The Metribuzin Guidance Document dated 6/85 requires additional residue data depicting residues in or on sugarcane forage resulting from a spot treatment with the 50, 70, or 75% WP or the 4 lb/gal FLC formulation at 5 lb ai/A, preceded by a postemergence treatment at 3 lb /A from tests conducted in HI. The need for a pregrazing interval and a tolerance for residues in or on sugarcane forage or a grazing restriction is noted. A processing study is also required.

As required by the Guidance Document, Mobay Chemical Corp. has included a grazing restriction on its label for sugarcane grown in HI. Therefore, DEB concludes (M.T. Flood, EPA Memorandum dated 10/27/89; DEB Nos. 4584 and 4585) that no additional residue data regarding sugarcane forage grown in HI is necessary. DEB has reevaluated a previously submitted processing study (FAP#5H5151) and concludes that these data satisfy the requirement for processing data. The Metribuzin Residue Chemistry Chapter (dated 12/84) notes that an increase in the feed additive tolerance for sugarcane molasses from 0.3 to 2 ppm was accepted as a result of FAP#5H5151. This higher tolerance has been established (43 FR 157:35915, 8/24/78); however, the entry in 40 CFR §186.250 remains incorrectly listed as 0.3 ppm. No additional data are required for this topic.

References (used):

N/A.

Discussion of the data:

N/A.

MAGNITUDE OF THE RESIDUE IN MEAT, MILK, POULTRY, AND EGGS

Milk and the Fat, Meat, and Meat Byproducts of Cattle, Goats, Hogs, Horses, and Sheep

Tolerance(s):

Tolerances of 0.7 ppm have been established for the combined residues of metribuzin and its triazinone metabolites in the fat, meat, and meat byproducts of cattle, goats, hogs, horses, and sheep. A tolerance of 0.05 ppm has been established for the same residues in milk [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 reserves the requirement for additional data regarding the magnitude of residues in milk, and the fat, meat, and meat byproducts of cattle, goats, hogs, horses, and sheep pending submission and evaluation of the requested data regarding the nature of the residue in animals. Presently, data gaps exist concerning the magnitude of metribuzin residues in soybean forage and hay and in the processed commodities of corn, soybeans, and wheat. Upon the receipt of the requested animal metabolism, storage stability, field trial, and processing data, the expected dietary intake for beef cattle, dairy cattle, and swine will be calculated, and the need for additional feeding studies will be reevaluated.

References (used):

N/A.

Discussion of the data:

N/A.

Eggs and the Fat, Meat, and Meat Byproducts of Poultry

Tolerance(s):

Tolerances of 0.7 ppm have been established for the combined residues of metribuzin and its triazinone metabolites in the fat, meat, and meat byproducts of poultry. A tolerance of 0.01 ppm has been established for the same residues in eggs [40 CFR §180.332].

Conclusions:

The Metribuzin Guidance Document dated 6/85 reserves the requirement for additional data regarding the magnitude of residues in eggs, and the fat, meat, and meat byproducts of

poultry pending submission and evaluation of the requested data regarding the nature of the residue in poultry. Presently, data gaps exist concerning the magnitude of metribuzin residues in soybean forage and hay and in the processed commodities of corn, soybeans, and wheat. Upon the receipt of the requested animal metabolism, storage stability, field trial, and processing data, the expected dietary intake for beef cattle, dairy cattle, and swine will be calculated, and the need for additional feeding studies will be reevaluated.

References (used):

N/A.

Discussion of the data:

N/A.

MASTER RECORD IDENTIFICATION NUMBERS

The following references were obtained from a Guideline Sequence Number search conducted on January 16, 1990 for documents on metribuzin.

Residue Chemistry Citations (used):

- 40042501 Christopher, R.; Muller, S. (1986) Distribution and Metabolism of Sencor in a Lactating Goat: Project No. SE-4-G. Unpublished study prepared by Mobay Corp. 41 p.
- 40042502 Christopher, R.; Muller, S. (1986) Distribution and Metabolism of Sencor in Laying Hens: Project No. SE-4-P. Unpublished study prepared by Mobay Corp. 41 p.
- 40255501 Schocken, M.; Philipppson, I.; Burge, C. (1987) Metabolism of Sencor in Wheat: Lab Project ID: 94592. Unpublished study prepared by Mobay Corp. 61 p.
- 40255502 Lenz, M.; Parker, G.; Hundal, J. (1987) Metabolism of [Carbon 14]Sencor in Soybeans: Lab Project ID: 94593. Unpublished study prepared by Mobay Corp. 45 p.
- 40277901 Loeffler, W. (1987) Sencor--Magnitude of Residue on Corn: Laboratory Project ID: SE-3086-86: Sencor Objective No. 3086. Unpublished Mobay report 94739 prepared by Morse Laboratories, Inc. 93 p.
- 40277902 Loeffler, W. (1987) Sencor--Magnitude of Residue on Seed Alfalfa: Laboratory Project ID: SE-3222-86: Sencor Objective No. 3222. Unpublished Mobay report 94745 prepared by Morse Laboratories, Inc. 57 p.
- 40277903 Loeffler, W. (1987) Sencor--Magnitude of Residue on Dry Peas: Laboratory Project ID: SE-1523-86: Sencor Objective No. 1523. Unpublished Mobay report 94735 prepared by Morse Laboratories, Inc. 46 p.
- 40277904 Loeffler, W. (1987) Sencor--Magnitude of Residue on Soybeans: Laboratory Project ID: SE-3745-86: Sencor Objective No. 3745. Unpublished Mobay report 94737 prepared by Morse Laboratories, Inc. 77 p.
- 40277905 Loeffler, W. (1987) Sencor--Magnitude of Residue on Wheat: Laboratory Project ID: SE-3052-85/86: Sencor Objective No. 3052. Unpublished Mobay report 94742 prepared by Morse Laboratories, Inc. 84 p.

40367601 Delk, J. (1987) Sencor - Magnitude of Residues on Wheat and Wheat Processing Products: Lab. Proj. ID. SE-3052-85/86. Unpublished Mobay Study 94743 prepared by Morse Laboratories, Inc. 25 p.

40367604 Calovich, C. (1987) Summary of Residue Data on Wheat - Potential for Secondary Residues in Animal Tissues and Products: Sencor: Laboratory Project ID: SE-3052-85/86. Unpublished study prepared by Morse Laboratories, Inc.

40367605 Delk, J. (1987) Sencor - Magnitude of Residues on Corn and Corn Processing Products. Unpublished Mobay compilation 94740 prepared by Harris Laboratories, Inc. and Texas A & M Univ. System. 123 p.

40371701 Calovich, C. (1987) Summary of Residue Data on Corn - Potential for Secondary Residues in Animal Tissues and Products: Sencor: Laboratory Project ID: SE-3086-86. Unpublished study prepared by Morse Laboratories, Inc. 12 p.

40802701 Anderson, L. (1988) SENCOR - Magnitude of Residue on Asparagus: Project ID. SE-1855-85. Unpublished study prepared by Morse Laboratories. 100 p.

41020601 Burge, C.; Parker, G. (1988) Stability of Metribuzin and Ethiozin Metabolite Residues in Biological Matrices During Frozen Storage: Report NO. 98504. Unpublished study prepared by Mobay Corporation. 62 p.

41021001 Ver Hey, M. (1988) Sencor, Sencor DA, Sencor DK and Sencor DADK: Multiresidue Method Trial: Final Report: Mobay 1093: SE161601. Unpublished study prepared by Colorado Analytical Research & Development Corp. 496 p.

Residue Chemistry Citations (not used):

[The following MRIDs contain data that were either not submitted in response to the Guidance Document or contain data that are not useful in satisfying residue chemistry data requirements.]

00149958 E.I. du Pont de Nemours & Co., Inc. (1985) [Residue Data for Canopy Herbicide]. Unpublished compilation. 41 p.

00153652 Mobay Chemical Corp. (1984) SENCOR: Residue Data [in Dry Soybeans and Potatoes]. Unpublished compilation. 89 p.

00153657 Febtke, C. (1972) Influence of photosynthesis-inhibiting herbicides on the regulation of crop plant metabolism. Pesticide Biochemistry and Physiology 2(3):312-323.

- 00153659 Smith, A.; Wilkinson, R. (1974) Differential absorption, translocation, and metabolism of metribuzin [4-amino-6-tert-butyl-3(methylthio)-as-triazine-5(4H)one] by soybean cultivars. *Physio. Plant.* 32:253-257.
- 00153660 Sandie, F.; Gronberg, R. (1975) The Absence of N-methyl Isomer of SENCOR in Field Treated Potatoes: Rept. No. 44789. Unpublished study prepared by Chemagro. 18 p.
- 00153661 Prestel, D.; Weisgerber, I.; Klein, W.; et al. (1978) Accountability of the Distribution and Metabolism of [Carbon-14]-metribuzin (SENCOR) in Potatoes, Carrots, and Soil under Field Conditions. Unpublished translation of study in *Chemosphere* (2):137-144 (1976). 12 p.
- 00153662 Mangeot, B.; Slife, F.; Rieck, C. (1979) Differential metabolism of metribuzin by two soybean (Glycine max) cultivars. *Weed Science* 27(3):267-269.
- 00153663 Frear, D.; Mansager, E.; Swanson, H. (1981) N-Glucoside Conjugates: Major Metribuzin Detoxication Products in Tomato. Unpublished paper presented at the North Central Weed Control Conference: Dec 8-10, 1981, Des Moines, IA. 11 p.
- 00153665 Frear, D.; Mansager, E.; Swanson, H.; et al. (1983) Metribuzin metabolism in tomatoes: Isolation and identification of N-glucoside conjugates. *Pesticide Biochemistry and Physiology* 19:270-281.
- 00153669 Mobay Chemical Corp. (1979) [Residue Chemistry Data of Metribuzin on Potatoes]. Unpublished compilation. 15 p.
- 00153671 Mobay Chemical Corp. (1978) [Residue Data for Sencor on Animal Ration, Tissues, Water, and Various Crops]. Unpublished compilation. 493 p.
- 00153692 Murphy, J.; Jacobs, K. (1974) Stability of SENCOR and Its Metabolites under Frozen Storage: Rept. No. 40707. Unpublished study prepared by Chemagro. 7 p.
- 00153721 Mobay Chemical Corp. (1978) [Residue Data and Soil Persistence of SENCOR]. Unpublished compilation. 776 p.
- 00153724 Timme, G.; Scholz, K. (1980) Behavior in Plants [of Sencor]. Unpublished study prepared by Bayer AG. 15 p.
- 00159415 Falb, L.; Smith, A. (1984) Metribuzin metabolism in soybeans: Characterization of the intraspecific differential tolerance. *J. Agric. Food Chem.* 32:1425-1428.

00159416 Frear, D.; Swanson, H.; Mansager, E. (1985) Alternate pathways of Metribuzin metabolism in soybean: Formation of N-glucoside and homoglutathione conjugates. Pesticide Biochemistry and Physiology 23:56-65.

00159417 Devlin, D.; Morrow, L.; Gealy, D. (19??) Absorption, Translocation, and Metabolism of Metribuzin by Downy Brome and Winter Wheat: [Progress Report]. Unpublished Mobay Report No. 88944 prepared by Washington State Univ., Agronomy Dept. and USDA-ARS. 4 p.

TABLE A. GENERIC DATA REQUIREMENTS FOR METRIBUZIN.

Data Requirement	Test Substance ¹	Does EPA have data to satisfy this requirement?	Bibliographic Citation ²	Must a data b under 3(c)(2)
<u>40 CFR §158.240 Residue Chemistry</u>				
171-2. Chemical Identity ³				
171-3. Directions for Use		(See Index) ⁴		
171-4. Nature of the Residue (Metabolism) - Plants	PAIRA	Partially	00159415 00159416 40255501 40255502	Y
171-4. Nature of the Residue (Metabolism) - Livestock	PAIRA & plant metabolites	Partially	40042501 40042502	Y
171-4. Residue Analytical Methods	TGAI & metabolites	Partially	41021001	R
171-4. Storage Stability	TEP & metabolites	Partially	41020601	Y
171-4. Magnitude of Residue in Plants <u>Root and Tuber Vegetables</u>				
- Carrots	TEP	Yes		N
- Potatoes	TEP	Yes		N
(processed commodities)	TEP	Yes		N

(Continued, footnotes follow)

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TABLE A. (Continued).

Data Requirement	Test Substance	Does EPA have data to satisfy this requirement?	Bibliographic Citation	Must data under 3(c)(
<u>Legume Vegetables</u>				
- Lentils	TEP	Yes		N
- Peas (dry, succulent)	TEP	Yes	40277903	N
- Soybeans	TEP	Partially	40277904	Y
<u>Foliage of Legume Vegetables</u>				
- Lentil forage and hay	TEP	Yes		N
- Pea vines and hay	TEP	Yes	40277903	N
- Soybean forage and hay	TEP	Partially	40277904	Y
<u>Fruiting Vegetables (Except Cucurbits)</u>				
- Tomatoes	TEP	Yes		N
(processed commodities)	TEP	Yes		N
<u>Cereal Grains</u>				
- Barley	TEP	Yes		N
(processed commodities)	TEP	Yes		N
- Corn (field and sweet)	TEP	Yes	40277901 40367605	N
(processed commodities)	TEP	No	40371701	Y

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement	Test Substance	Does EPA have data to satisfy this requirement?	Bibliographic Citation	Must data under 3(c)(
- Wheat (processed commodities)	TEP TEP	Yes No	40277905 40367601 40367604	N Y
<u>Forage, Fodder & Hay of Cereal Grains</u>				
- Barley forage, hay, and straw	TEP	Yes		N
- Corn forage & fodder	TEP	Yes	40277901 40367605	N
- Wheat forage & straw	TEP	Yes	40277905	N
<u>Grass Forage, Fodder and Hay</u>				
- Grass forage and hay	TEP	Yes	40277902	N
<u>Non-Grass Animal Feed</u>				
- Alfalfa forage and hay	TEP	Yes	40277902	N
- Sainfoin forage and hay	TEP	Yes		N
<u>Miscellaneous Commodities</u>				
- Asparagus	TEP	Yes	40802701	N
- Sugarcane (processed commodities)	TEP TEP	Yes Yes		N N
171-4. Magnitude of residue in Meat/Milk/Poultry/Eggs	TGA1 or plant metabolites	Yes		R

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TABLE C. (Continued).

1. Test substance: PAI = purified active ingredient; PAIRA = purified active ingredient; TEP = Typical end-use product; TGA1 = technical grade of the active ingredient; MP product.

2. These references were submitted in response to the Metribuzin Guidance Document

3. The same chemical identity data are required as under 40 CFR §158.150-190, with that could constitute residue problems. Refer to Product Chemistry Data Requirements

4. The 5/2/89 update of the index of uses for metribuzin was used to create this d

5. The submitted metabolism data are inadequate to fulfill the requirements for th in plants. The following additional data are required: The identities of the unk designated "Metabolite 15" in soybean plant tissue and "Metabolite 11" in soybean s characterized. These metabolites must be confirmed using suitable methods such as nuclear magnetic resonance (NMR).

The registrant must characterize the radioactive residues in the aqueous fraction o or HPLC. Any individual metabolite present at over 10% of the total radioactive re confirmed using suitable methods such as mass spectroscopy (MS) or nuclear magnetic

Representative samples of wheat straw and soybean tissue from the plant metabolism using a currently accepted or proposed enforcement analytical method in order to as will determine all possible metabolites of concern.

6. The submitted data do not satisfy the requirements for a poultry metabolism stu additional data are required: Representative thin-layer chromatograms (TLC's) and radioactivity (the total recovered by the various extraction procedures divided by determined by combustion and liquid scintillation counting x 100) must be submitted representative samples from the poultry metabolism studies must be analyzed using a proposed enforcement analytical method in order to ascertain that this method will metabolites of concern.

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TABLE C. (Continued).

7. The submitted data do not fulfill the requirements for the qualitative nature of ruminants, the following additional data are required: The percent recoveries of r recovered by the various extraction procedures divided by the radioactivity determined (liquid scintillation counting x 100) must be reported for ruminants.

The registrant must attempt to characterize the unidentified metabolites designated liver and "Unknowns 8a and 8b" in goat kidney and milk. Data showing the identity products from "Unknown 9" in goat liver may be acceptable. In goat kidney the cond applied to unknowns 8a and 8b (including temperature and time) must also be submitted made to identify the unknowns by suitable confirmatory methods such as NMR or mass

Representative TLC chromatograms from the ruminant metabolism must be submitted. R from the ruminant metabolism studies must be analyzed using a currently accepted or analytical method in order to ascertain that this method will determine all possible

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8. If radiolabeled validation of existing analytical methodology for plants and an "Qualitative Nature of the Residue in Plants" and Qualitative Nature of the Residue additional details) indicates that a major portion of the total radioactive residue identified by the available methods, radiolabeled validation of new proposed method

9. The sample storage intervals and conditions must be supplied for all residue data of tolerances, whether previously submitted or required in this update. Storage studies of previously submitted residue data are required for only those samples deemed to assessment. Data are also required which depict the decline in the levels of metabolites in commodities stored under the range of conditions and for the range of intervals bearing measurable weathered residues or fortified with metribuzin residues of conc milk, and egg samples must be analyzed immediately after harvest or fortification at intervals that allow for reasonable unforeseen delays in sample analysis. In laboratory fortified samples the pure active ingredient and pure metabolites must be used. No residues are used, the test substance must be a typical end use product. For additional conducting storage stability studies, the registrant is referred to an August, 1987 Effects of Storage Validity of Pesticide Residue Data available from NTIS under order

The qualitative nature of the residue in plants and animals is not adequately understood

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TABLE C. (Continued).

data on plant and animal metabolism indicate the presence of additional metabolites of concern, data depicting the stability of these residues during storage will be required.

10. NOTE TO SRRD: Presently, there are no registered uses for metribuzin on carrots. If the registrant declares intent to include this use site on a product label, and to submit appropriate residue data, we recommend that the existing tolerance for the combined residues of triazinone metabolites in or on carrots be revoked.

11. The sample storage conditions must be supplied for all previously submitted re commodities and their processed products.

12. Data submitted in response to the Guidance Document satisfy the requirements for

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W 13. The submitted data indicate that a tolerance of 0.3 ppm is needed. Therefore, required: The registrant must propose an appropriate tolerance for the combined residues of triazinone metabolites in or on soybeans. The available data indicate that a tolerance of 0.3 ppm would be appropriate, toxicological considerations permitting.

14. The submitted data indicate that an increased tolerance is needed for combined vine hay (straw). The registrant has requested that the tolerance for hay be increased to 4 ppm (PP#8F3683/FAP8H5563). DEB considers the proposed tolerance of 4 ppm for pea straw

15. The submitted data do not satisfy the requirements for this topic. Therefore, required: Data depicting metribuzin residues of concern in or on soybean forage are required following the last of two postemergence applications of a representative WP or the at 0.5 lb ai/A preceded by a preemergence application at 1 lb ai/A and a preplant application at 1 lb ai/A. Tests must be conducted in the MS delta region where this use is permitted

16. The registrant has proposed a food additive tolerance of 0.2 ppm (PP#8F3683/FA processed products.)

17. The submitted data satisfy the requirement for additional field residue data for However, the following additional data are required: The registrant must amend all

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TABLE C. (Continued).

to specify a maximum seasonal application rate, which must be consistent with that data used to support the tolerance.

18. NOTE TO SRRD: Presently, there are no registered uses for metribuzin on sweet corn. Unless an interested party declares intent to include this use site on a product label, appropriate supporting residue data, we recommend that the existing tolerance for metribuzin and its triazinone metabolites in or on corn, fresh (including sweet corn removed) be revoked. Concomitant with the establishment of an individual tolerance for field corn grain we recommend that the tolerance for residues in or on corn grain be revoked.

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+ 19. A processing study depicting metribuzin residues of concern in wet millings (s refined oil), in dry millings (grits, meal, flour, crude oil, and refined oil), pro grain bearing measurable, weathered residues. It is recommended that an exaggerate theoretical concentration factor be used. If the data indicate a potential for con processed product, an appropriate food/feed additive tolerance must be proposed.

20. The registrant must amend all pertinent labels specifying an appropriate PHI f consistent with that reflected in the residue data used to support the tolerance.

21. Data submitted in response to the Guidance Document do not satisfy the require study. The following is required: A processing study depicting metribuzin residue (bran, flour, middlings, and shorts) and in grain dust processed from wheat grain b weathered residues. It is recommended that an exaggerated rate greater than the th factor be used. If the data indicate a potential for concentration in any processe food/feed additive tolerance must be proposed.

22. The currently established tolerance of 2 ppm for combined residues in or on ba appropriate.

23. Data submitted in response to the Guidance Document satisfy the requirement fo corn fodder.

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TABLE C. (Continued).

24. No data were submitted for corn silage, however, no data are necessary because residues in or on forage covers residues in or on silage.
25. Data submitted in response to the Guidance Document indicate that a tolerance appropriate, toxicological considerations permitting.
26. The registrant must amend all pertinent labels to specify a maximum seasonal alfalfa, which must be consistent with that reflected in the residue data used to s addition, the use site alfalfa seed must be added to all pertinent labels with a 18
27. A tolerance for residues in or on alfalfa chaff is not necessary.
28. The submitted data indicate that a tolerance of 0.1 ppm would be appropriate, considerations permitting.
29. The registrant has complied with the Guidance Document requirements and has am by including a grazing restriction for sugarcane grown in #1.
30. A reevaluation of the submitted data has indicated that the data satisfy the r processing study.
31. NOTE TO SRRD: An increase in the feed additive tolerance for sugarcane molass accepted as a result of FAP#5H5151, but this revision was never completed. Mobay C a copy of the final rule (43 FR 157:35915, 8/24/78) and has proposed a feed additiv combined residues of metribuzin and its triazinone metabolites in sugarcane molasse
32. Presently, the nature of the residue in animals is not adequately understood a some feed items (soybean forage and hay and the processed commodities of corn, soyb the receipt of the requested animal metabolism, storage stability, field trial, and expected dietary intake for beef cattle, dairy cattle, and swine will be calculated additional feeding studies will be reevaluated.